

- route, R being used to select R available regeneration points on the route.
9. A system as claimed in claim 9 wherein the wavelength selector is further adapted to:
generate sets of R regeneration points;
evaluate the respective sets of R regeneration points
in accordance with at least one criteria; and
select a set of regeneration points that achieves a
highest evaluation among the sets evaluated.
10. A system as claimed in claim 1 wherein the constraint-based routing validator receives an identifier of the at least one wavelength selected by the WRM, and is adapted to:
parse the at least one wavelength into respective sections;
obtain parameters of transmission equipment in each of the sections; and
determine if signal transmission through the respective sections is viable.
11. A system as claimed in claim 10 wherein the sections are defined by a route selected by the WRM.
12. A system as claimed in claim 10 wherein the constraint-based route validator is further adapted to interface with a photonic control plane adapted to:
store values of stable properties of transmission equipment and sections in the network; and

request transmission equipment status information directly from the transmission equipment.

13. A system as claimed in claim 10 wherein the constraint-based routing validator further determines equipment availability to ensure that the at least one wavelength is available, and that the transmission equipment in the route is operating within established parameters; and, evaluates signal transmission viability across each of the at least one wavelength.
14. A system as claimed in claim 13 wherein the evaluation of signal transmission viability generates parameter values for transmission equipment that are used to provide coarse grain settings for the transmission equipment, and the constraint-based routing validator is further adapted to send respective messages to the transmission equipment directing the transmission equipment to set transmission parameters for the channel.
15. A system as claimed in claim 14 wherein the evaluation involves sending a low-power test signal through the channel.
16. A system as claimed in claim 14 wherein the evaluation involves generating a mathematical simulation of a signal transmitted through the channel, taking into account the transmission equipment in each of the sections that the channel traverses.

17. A system as claimed in claim 13 wherein the constraint-based routing validator is further adapted to return a message to the WRM indicating that the channel is viable.
18. A method for adaptive wavelength rerouting in a wavelength division multiplexed WDM optical network that performs wavelength selective switching, in response to a request for transmission capacity between two network elements (A and B), comprising steps of:
- generating a plausible communications channel using at least one rule abstracted from physical constraints on optical signal propagation through the optical network; and
- verifying properties of transmission components for supporting the plausible communications channel to ensure a viability of the plausible communications channel.
19. A method as claimed in claim 18 wherein the step of generating a plausible communications channel comprises steps of:
- selecting a route from a predefined set of routes between A and B; and
- selecting at least one wavelength that is unused by sections in the selected route according to wavelength utilization information.
20. A method as claimed in claim 19 wherein the step of selecting a route comprises a step of evaluating each

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